

## 15. International Arbitrage

- Arbitrage can be defined as capitalizing on a discrepancy in quoted prices to make a risk free profit.
- The effect of arbitrage on demand and supply is to cause prices to realign, such that risk-free profit is no longer feasible.
- International Arbitrators play a critical role in facilitating exchange rate equilibrium. They try to earn a risk-free profit whenever there is exchange rate disequilibrium.
- As applied to foreign exchange and international money markets, international arbitrage (i.e., taking risk-free positions by buying and selling currencies simultaneously) takes three major forms:
  - Locational arbitrage
  - Triangular arbitrage
  - Covered interest arbitrage

### Locational Arbitrage

- Locational arbitrage is possible when a bank's buying price (bid price) is higher than another bank's selling price (ask price) for the same currency.

**Example :**

Bank C	Bid	Ask	Bank D	Bid	Ask
NZ\$	\$0.635	\$0.640	NZ\$	\$0.645	\$0.650

Buy NZ\$ from Bank C @ \$0.640, and sell it to Bank D @ \$0.645. Profit = \$0.005/NZ\$.

### Triangular Arbitrage

- Triangular arbitrage is possible when a cross exchange rate (exchange rate between two foreign currencies) quoted by a bank differs from the rate calculated from dollar-based spot rate quotes.

Example	Bid	Ask
Bank A: British pound (£)	\$1.60	\$1.61
Bank B: Malaysian ringgit (MYR)	\$2.00	\$2.01
C: British pound (£)	MYR8.10	MYR8.20
Calculated cross rate (AB) £	MYR8.00	MYR8.01

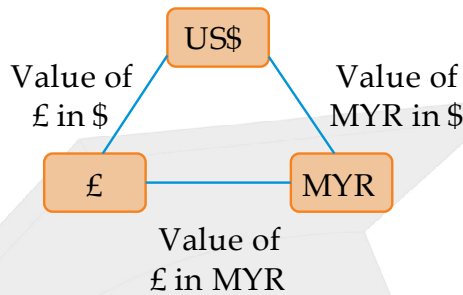
### Conducting Triangular Arbitrage

- Cross rates (£/MYR) are in disequilibrium and there is room for risk-free profit if the American arbitrager had access to £
- Challenges: US arbitrageurs do not (1) have £, and (2) calculated cross rates are not quoted by banks
- Example: Let's assume that the US arbitrager has \$10,000 to invest in deal and let's see how much profit could be made.

### Profit from Triangular Arbitrage

- Sell \$10,000 and buy £ from Bank A =  $\$10,000 \div 1.61 = \text{£}6,211$
- Sell £6,211 to buy MYR at Bank C =  $\text{£}6,211 \times 8.10 = \text{MYR}50,309$
- Sell MYR50,309 to buy \$ at Bank B  $\text{MYR}50,309 \times 0.20 = \$10,062$
- Triangular arbitrage profit =  $\$10,062 - \$10,000 = \$62$  or  $(\$62/\$10,000) \times 100 = 0.62\%$

### Triangular Arbitrage



When the actual and calculated cross exchange rates differ, triangular arbitrage will force them back into equilibrium.

### Covered Interest Arbitrage

- Covered interest arbitrage is the process of capitalizing on the interest rate differential (on assets of similar risk and maturity) between two countries while covering for exchange rate risk.
- Covered interest arbitrage tends to force a relationship between forward rate premium or discount (difference between the forward and spot rate) and interest rate differentials.

#### Example

£ spot rate 90-day forward rate = \$1.60

U.S. 90-day interest rate 2%

U.K. 90-day interest rate 4%

Borrow \$ at 3%, or use existing funds which are earning interest at 2%. Convert \$ to £ at \$1.60/£ and engage in a 90-day forward contract to sell £ at \$1.60/£. Lend £ at 4%

Note: Profits are not achieved instantaneously.

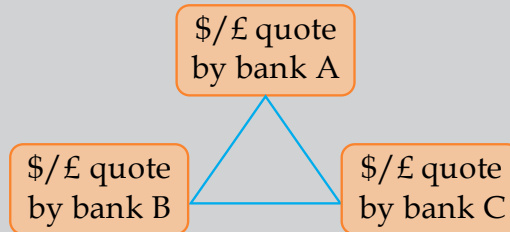
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### Comparing Arbitrage Strategies

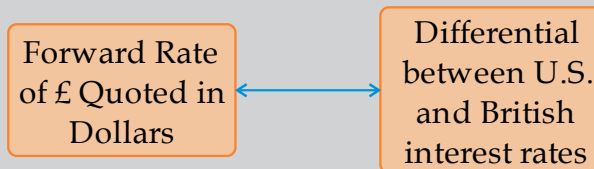
**Location :** Capitalizes on discrepancies in exchange rates across locations.



**Triangular Arbitrage :** Capitalizes on discrepancies in cross exchange rates.



**Covered Interest Arbitrage :** Capitalizes on discrepancies between the forward rate and the interest rate differential.



Any discrepancy will trigger arbitrage, which will then eliminate the discrepancy, thus making the foreign exchange market more orderly.

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